

Railroads

EQUITY RATE				12.25%	
CAPITAL ASSET PRICING MODEL					
CAPM Ex Ante	5.95%				PAGE 6
DIVIDEND GROWTH MODELS (Single Stage)					
Value Line, based on Dividends Growth	11.50%				7
Value Line, based on Earnings Growth	13.00%				8
Value Line, based on Return on Equity	13.25%				9
FCFE GROWTH MODEL (Multi Stage)					
	11.25%				10
Median	11.50%		5.95% - 13.25%		RANGE
DEBT RATE				3.50%	11
SECURED DEBT (LEASE) RATE				2.80%	11
MARKET CAPITAL STRUCTURE					
Equity	78%	x	12.25%	=	9.56%
Secured Debt	3%	x	2.80%	=	0.08%
Debt	19%	x	3.50%	=	0.67%
Marginal Tax Rate	24%	=	(1-.24)	x	0.75%
					<u>0.57%</u>
WEIGHTED AVERAGE COST OF CAPITAL				10.1%	

SUPPORT FOR GUIDELINE COMPANIES

WASHINGTON STATE DEPARTMENT OF REVENUE

2022 ASSESSMENT YEAR

RAILROADS

Capital Structure at Book Value

Company	Ticker	Beta	Fin'l Strength	Operating Margin	P/E Ratio	Div'd Yield	Common Stock	%	Preferred Stock	%	Long Term Debt	%	Total Debt & Equity
Union Pacific Corp.	UNP	1.10	A++	53.5%	21.7	1.75%	14,882,556,250	35.3%	-	0.0%	27,319,000,000	64.7%	42,201,556,250
Norfolk Southern Corp.	NSC	1.10	A+	50.0%	21.5	1.54%	14,223,456,800	51.7%	-	0.0%	13,287,000,000	48.3%	27,510,456,800
CSX Corp.	CSX	1.05	B++	53.0%	21.4	1.07%	13,275,000,000	45.1%	-	0.0%	16,185,000,000	54.9%	29,460,000,000
Canadian National	CNI	0.85	A	50.0%	21.7	1.63%	16,623,360,000	63.4%	-	0.0%	9,581,600,000	36.6%	26,204,960,000
Canadian Pacific	CP	1.00	A	53.0%	20.0	0.95%	7,334,310,000	33.0%	-	0.0%	14,861,600,000	67.0%	22,195,910,000
Mean		1.02		51.9%	21.3	1.38%	13,267,736,610	45.7%		0.0%	16,246,840,000	54.3%	
Weighted Mean							66,338,683,050	45.0%	-	0.00%	81,234,200,000	55.0%	147,572,883,050
Median		1.05			21.5	1.54%		45.1%		0.0%		54.9%	
Std Dev		0.10			0.73	0.4%		12.5%		-		12.5%	
Coeff Var		0.10			0.03	0.26		27.2%		-		22.9%	
Harmonic Mean		1.01			21.25	0.01		43.1%				51.7%	
Max		1.10			21.75	1.75%		63.4%		0.0%		67.0%	
Min		0.85			19.98	0.95%		33.0%		0.0%		36.6%	

Say **1.05**

SUPPORT FOR CAPITAL STRUCTURE MARKET VALUE

WASHINGTON STATE DEPARTMENT OF REVENUE

2022 ASSESSMENT YEAR

RAILROADS

Capital Structure at Market Value

Company	Ticker	Stock Price	Common Shares	Common Stock	%	Preferred Stock	%	Operating Lease	%	Long Term Debt	%	Total Debt & Equity
Union Pacific Corp.	UNP	251.93	642,875,000	161,959,498,750	80.6%	-	0.0%	7,673,402,921	3.8%	31,416,000,000	15.6%	201,048,901,671
Norfolk Southern Corp.	NSC	297.71	243,344,000	72,445,942,240	78.4%	-	0.0%	2,894,222,961	3.1%	17,033,000,000	18.4%	92,373,165,201
CSX Corp.	CSX	37.49	2,250,000,000	84,352,500,000	80.1%	-	0.0%	1,530,476,583	1.5%	19,439,000,000	18.5%	105,321,976,583
Canadian National	CNI	122.86	710,400,000	87,279,744,000	85.5%	-	0.0%	3,253,502,533	3.2%	11,539,200,000	11.3%	102,072,446,533
Canadian Pacific	CP	71.94	669,800,000	48,185,412,000	72.1%	-	0.0%	1,634,740,651	2.4%	17,012,000,000	25.5%	66,832,152,651
			Mean		79.3%		0.0%		2.8%		17.9%	
			Weighted Mean	454,223,096,990	80.0%	-	0.0%	16,986,345,650	3.0%	96,439,200,000	17.0%	567,648,642,640
			Median		80.1%		0.0%		3.1%		18.4%	
			Harmonic Mean		79.1%				2.5%		16.7%	
			Std Dev		4.8%		0.0%		0.9%		5.2%	
			Coeff Var		16.4%				3.1%		3.5%	
			Max		85.5%		0.0%		3.8%		25.5%	
			Min		72.1%		0.0%		1.5%		11.3%	
			Target		78%		0%		3%		19%	100%

Source:

Stock Price: Yahoo

Market Value Debt: Bond Analysis

SUPPORT FOR MARKET MULTIPLES

WASHINGTON STATE DEPARTMENT OF REVENUE

2022 ASSESSMENT YEAR

RAILROADS

Company	Ticker	Stock Price	Revenues	Multiple	Cash Flow	Multiple	Earnings	Multiple	Book Value	Multiple
Union Pacific Corp.	UNP	251.93	34.20	7.4	13.80	18.3	9.95	25.3	23.15	10.9
Norfolk Southern Corp.	NSC	297.71	45.90	6.5	17.25	17.3	12.10	24.6	58.45	5.1
CSX Corp.	CSX	37.49	5.60	6.7	2.20	17.0	1.55	24.2	5.90	6.35
Canadian National	CNI	122.86	16.60	7.4	6.60	18.6	4.70	26.1	23.40	5.25
Canadian Pacific	CP	71.94	9.75	7.4	4.10	17.5	3.15	22.8	10.95	6.57
		Mean		7.1		17.7		24.6		6.8
		Median		7.4		17.5		24.6		6.4
		Harmonic Mean		7.0		17.7		24.6		6.3
		Max		7.4		18.6		26.1		10.9
		Min		6.5		17.0		22.8		5.09
		Std Dev		0.4		0.7		1.2		2.4
		Coefficient of Variation		0.1		0.0		0.1		0.3
		Percentile .25		6.7		17.3		24.2		5.3
		Percentile .75		7.4		18.3		25.3		6.6
		Say		7.00		17.50		24.50		6.50

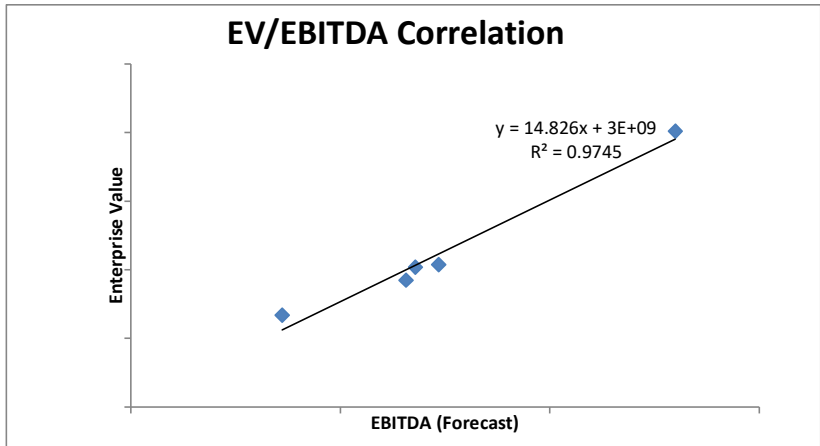
ENTERPRISE VALUE MULTIPLES

WASHINGTON STATE DEPARTMENT OF REVENUE

2022 ASSESSMENT YEAR

RAILROADS

Guideline Companies	Ticker	EV+OL	EBITDA + OL	EV / EBITDA	Annual Cash Flow Rate Change VL	EBITDA	EV / EBITDA	Revenue	EV/Sales	Cash Flow	Debt Service	EV / CF
Union Pacific Corp.	UNP	\$ 201,048,901,671	11,974,000,000	16.79	8.50%	12,991,790,000	15.48	23,312,000,000	8.62	9,486,000,000	1,099,560,000	18.99
Norfolk Southern Corp.	NSC	\$ 92,373,165,201	6,054,000,000	15.26	8.50%	6,568,590,000	14.06	11,997,800,000	7.70	4,517,100,000	596,155,000	18.07
CSX Corp.	CSX	\$ 103,681,976,583	6,649,000,000	15.59	10.50%	7,347,145,000	14.11	13,312,500,000	7.79	5,325,000,000	680,365,000	17.26
Canadian National	CNI	\$ 101,827,646,533	6,316,000,000	16.12	7.50%	6,789,700,000	15.00	12,512,000,000	8.14	5,134,000,000	403,872,000	18.39
Canadian Pacific	CP	\$ 66,832,152,651	3,332,000,000	20.06	8.50%	3,615,220,000	18.49	7,202,500,000	9.28	3,115,500,000	595,420,000	18.01
Mean							15.43		8.31	5,515,520,000		18.14
Median							15.00		8.14	5,134,000,000		18.07
Max							18.49		9.28	9,486,000,000.00		18.99
Min							14.06		7.70	3,115,500,000.00		17.26
Std Dev							1.81		0.65	2,382,409,773.11		0.63
Coefficient of Var							0.12		0.08	0.43		0.03
Harmonic Mean							15.27		8.27	4,852,726,646		18.13
						Say	15.25		8.25			18.00



14.00 put in income direct excluding IPP
15.75 put in income direct including IPP

Forecast EV/EBITDA By Rank

Guideline Companies	EV/EBITDA forecast		
Norfolk Southern Corp.	14.06	14.09	Low Average
CSX Corp.	14.11	14.11	Low Median
		14.00	Say
Canadian National	15.00	16.32	Average
Union Pacific Corp.	15.48	15.48	Median
Canadian Pacific	18.49	15.75	Say

**SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT
CAPITAL ASSET PRICING MODEL**

WASHINGTON STATE DEPARTMENT OF REVENUE
2022 ASSESSMENT YEAR
RAILROADS

Ex Ante
Ke = Rf + B (Rp)

Ke = Cost of Equity	5.95%
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Rm =	rate of return	5.76%
Rf =	risk free rate	1.90%
Rp =	risk premium	3.86%
B =	Beta	1.05

Rp = Risk Premium	3.86%
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to above

Shannon Pratt and Roger Grabowski	3.5 - 6%	
Cost of Capital, Applications and Examples, Fifth Edition, 2014		
Dr. Aswath Damodaran	4.24%	chart page 15
http://pages.stern.nyu.edu/~adamodar/	3.86%	adjusted for Rf
2021 Implied Premium		
Federal Reserve Bank of Richmond	8.70%	10 year expected real re
The CFO Survey, 4th Quarter 2021	7.18%	adjusted for Rf
https://www.richmondfed.org/cfosurvev	1.52%	Rf rate adjusted by 10 y

Rf = Risk Free Rate	1.90%
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to above

Value Line Investment Survey, Selected Yields January 7, 2022, page 2089
as of 12-27-21

US Treasury Securities year end data		
	5 year	1.26%
	10 year	1.48%
	30 year	1.88%
	30 year Zero	1.90%

Federal Reserve Statistical Release (<http://www.federalreserve.gov/Releases/H15/Current/>)

As of 12-31-21

Treasury Constant Maturities		
	5 year	1.26%
	10 year	1.52%
	20 year	1.94%
	30 year	1.90%
	20 year TIPS	-0.63%
	30 year TIPS	-0.44%

Inflation	2.34%
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Federal Reserve Statistical Release (<http://www.federalreserve.gov/Releases/H15/Current/>)

As of 12-31-21

Inflation Indication from Treasury Inflation-Protected Securities		
	20 year	2.57%
	30 year	2.34%

Federal Reserve Bank of Philadelphia

The Livingston Survey December 17, 2021, page 8		
		Inflation median (measured by the CPI) over next 10 years
		2.40%
https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey		

Gross Domestic Product (GDP)	4.14%
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real GDP + inflation est

Federal Reserve Projected Long Run Real GDP Growth

	Median Projection Value From Dec 15, 2021 Report, page 2	1.80%
https://www.federalreserve.gov/monetarypolicy/files/fomcproptabl20211215.pdf		

Congressional Budget Office Real GDP Economic Projections

The Budget and Economic Outlook 2021-2031		
	Average Percentage Change Year To Year	2021-2025
		1.90%
	2026-2031	1.70%
https://www.cbo.gov/system/files/2021-02/56970-Outlook.pdf		

Federal Reserve Bank of Philadelphia

The Livingston Survey December 17, 2021, page 8		
		Median Annual Average Real GDP Growth Rate for Next 10 Years
		2.10%
https://www.philadelphiafed.org/research-and-data/real-time-center/livingston-survey		

**SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT
DIVIDEND GROWTH MODEL**

WASHINGTON STATE DEPARTMENT OF REVENUE
2022 ASSESSMENT YEAR
RAILROADS

Based on Dividend Growth

$$K_e = (D_1 + BB_1) / P_0 + G_D$$

Ke = Cost of Equity
D1 = Expected Dividends
BB1 = Expected Share Repurchase
P0 = Current Stock Price
GD = Sustainable Growth -- Dividend

Company	Ticker	Stock Price (Po)	Expected FCFE1	Expected Dividend (D1)	Expected Buyback	Dividend Yield (D1/Po)	Buyback Yield (BB1)	Total Yield	Growth	Ke
Union Pacific Corp.	UNP	251.93	7.33	4.40	2.93	1.75%	1.16%	2.91%	6.00%	8.91%
Norfolk Southern Corp.	NSC	297.71	8.45	4.58	3.87	1.54%	1.30%	2.84%	9.00%	11.84%
CSX Corp.	CSX	37.49	0.99	0.40	0.59	1.07%	1.58%	2.65%	11.00%	13.65%
Canadian National	CNI	122.86	3.92	2.00	1.92	1.63%	1.56%	3.19%	7.00%	10.19%
Canadian Pacific	CP	71.94	2.35	0.68	1.67	0.95%	2.32%	3.27%	11.50%	14.77%
				Mean				2.97%		11.87%
				Median				2.91%		11.84%
				Harmonic Mean				2.95%		11.47%
				Std Dev				0.26%		2.40%
				Coeff Var				8.61%		20.26%
				Max				3.27%		14.77%
				Min				2.65%		8.91%
									Say	11.50%

Source: Value Line Projections 23-25

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**SUPPORT FOR YIELD CAPITALIZATION EQUITY C
DIVIDEND GROWTH MODEL**

WASHINGTON STATE DEPARTMENT OF REVENUE
2022 ASSESSMENT YEAR
RAILROADS

Based on Earnings Growth

$$K_e = (D_1 + BB_1 / P_0) + G_D$$

Ke = Cost of Equity
D1 = Expected Dividends
P0 = Current Stock Price
G = Sustainable Growth -- Earnings
assumptive Sustainable growth can not exceed inflation plus real GDP

Company	Ticker	Stock Price (P ₀)	Expected FCFE1	Expected Dividend (D1)	Expected Buyback	Yield (D ₁ /P ₀)	Buyback Yield (BB ₁ /P ₀)	Total Yield	Growth	K _e Sustainable Growth
Union Pacific Corp.	UNP	251.93	7.33	4.40	2.93	1.75%	1.16%	2.91%	10.00%	12.91%
Norfolk Southern Corp.	NSC	297.71	8.45	4.58	3.87	1.54%	1.30%	2.84%	10.50%	13.34%
CSX Corp.	CSX	37.49	0.99	0.40	0.59	1.07%	1.58%	2.65%	11.50%	14.15%
Canadian National	CNI	122.86	3.92	2.00	1.92	1.63%	1.56%	3.19%	8.50%	11.69%
Canadian Pacific	CP	71.94	2.35	0.68	1.67	0.95%	2.32%	3.27%	9.50%	12.77%
					Mean	1.38%				12.97%
					Median	1.54%				12.91%
					Harmonic Mean	1.30%				12.92%
					Std Dev	0.36%				0.89%
					Coeff Var	25.72%				6.90%
					Max	1.75%				14.15%
					Min	0.95%				11.69%
										Say 13.00%

Source: Value Line Projections 23-25

Say
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**SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT
DIVIDEND GROWTH MODEL**

WASHINGTON STATE DEPARTMENT OF REVENUE
2022 ASSESSMENT YEAR
RAILROADS

Based on Return on Equity

$$K_e = (D1 / P_o) + G$$

Ke = Cost of Equity
D1 = Expected Dividends
E1 = Expected Earnings
Po = Current Price
G = Sustainable Growth
b = Retained Earnings % (plowback)
ROE = Return on Equity

Company	Ticker	Stock Price (Po)	Expected Earnings (E1)	Total Yield	\$ Payout	Payout Ratio	b (1-payout ratio)	ROE	Growth (b*ROE)=(G)	Ke
Union Pacific Corp.	UNP	251.93	11.60	2.91%	7.33	0.63	0.37	52.50%	19.34%	22.25%
Norfolk Southern Corp.	NSC	297.71	13.85	2.84%	8.45	0.61	0.39	22.00%	8.57%	11.41%
CSX Corp.	CSX	37.49	1.75	2.65%	0.99	0.57	0.43	28.00%	12.12%	14.77%
Canadian National	CNI	122.86	5.65	3.19%	3.92	0.69	0.31	25.00%	7.66%	10.85%
Canadian Pacific	CP	71.94	3.60	3.27%	2.35	0.65	0.35	26.50%	9.20%	12.47%
									Mean	14.35%
									Median	12.47%
									Harmonic Mean	13.42%
									Std Dev	4.66%
									Coeff Var	32.50%
									Max	22.25%
									Min	10.85%
									Say	13.25%

SUPPORT FOR YIELD CAPITALIZATION EQUITY COMPONENT MULTISTAGE FREE CASH FLOW TO EQUITY MODEL

Washington State Department of Revenue
2022 ASSESSMENT YEAR

Based on Earnings Growth and Required Reinvestment

Company	Ticker	Ke	New Ke
Union Pacific Corp.	UNP	10.99%	11.06%
Norfolk Southern Corp.	NSC	11.36%	10.90%
CSX Corp.	CSX	11.89%	10.02%
Canadian National	CNI	10.23%	7.61%
Canadian Pacific	CP	11.81%	8.96%
Mean		11.26%	9.71%
Harmonic Mean		11.22%	9.52%
Median		11.36%	10.02%
Say		11.25%	9.75%

SUPPORT FOR DEBT RATING AND DEBT YIELD RATE

WASHINGTON STATE DEPARTMENT OF REVENUE

2022 ASSESSMENT YEAR

RAILROADS

Company	Ticker	Mergent's Ratings	S&P Ratings	WAYTM	S&P YTM (avg)	Mergent's Ratings	S&P Ratings	Mergent's	S&P		
Union Pacific Corp.	UNP	Baa1	A-	2.72%	2.82%	10	9	Aaa1	AAA+	1	
Norfolk Southern Corp.	NSC	Baa1	BBB+	2.90%	3.03%	10	10	Aaa2	AAA	2	
CSX Corp.	CSX	Baa1	BBB+	2.54%	3.00%	10	10	Aaa3	AAA-	3	
Canadian Pacific	CP	Baa2	BBB+	3.04%	2.68%	11	10	Aa1	AA+	4	
Canadian National	CNI	A2	A	2.35%	2.88%	8	8	Aa2	AA	5	
Overall Average Debt Rating		Baa1	BBB+	2.71%		9.8	9.4	Aa3	AA-	6	
					bond analysis, A-CCC bonds				A1	A+	7
					All issues 20+ year maturities				A2	A	8
									A3	A-	9
Guideline Companies, All Ratings			2.73%	3.50%							
					bond analysis page 12				Baa1	BBB+	10
									Baa2	BBB	11
									Baa3	BBB-	12
									Ba1	BB+	13
									Ba2	BB	14
									Ba3	BB-	15
									B1	B+	16
									B2	B	17
									B3	B-	18
									Caa1	CCC+	19
									Caa2	CCC	20
Mergent's Bond Record January 2021, page 13											
Corporate	Aaa	Aa	A	Baa							
October	2.68%	2.86%	3.02%	3.35%							
November	2.62%	2.77%	2.95%	3.28%							
December	2.71%	2.82%	3.04%	3.37%							
4th Qtr Average	2.67%	2.82%	3.00%	3.33%							
2020 Average	2.30%	2.49%	2.80%	3.30%							
Public Utilities	Aaa	Aa	A	Baa							
October		2.99%	3.09%	3.32%							
November		2.91%	3.02%	3.25%							
December		3.01%	3.13%	3.36%							
4th Qtr Average		2.97%	3.08%	3.31%							
2020 Average		2.64%	2.86%	3.16%							
Industrials	Aaa	Aa	A	Baa							
October	2.68%	2.73%	2.96%	3.38%							
November	2.62%	2.63%	2.95%	3.37%							
December	2.71%	2.62%	2.95%	3.37%							
4th Qtr Average	2.67%	2.66%	2.95%	3.37%							
2020 Average	2.30%	2.33%	2.73%	3.43%							
Debt Yield Rate				3.50%							
Cost of Secured Debt (Operating Lease) Rate				2.80%							

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01/02/2022

Railroad Bond Analysis

2022.5

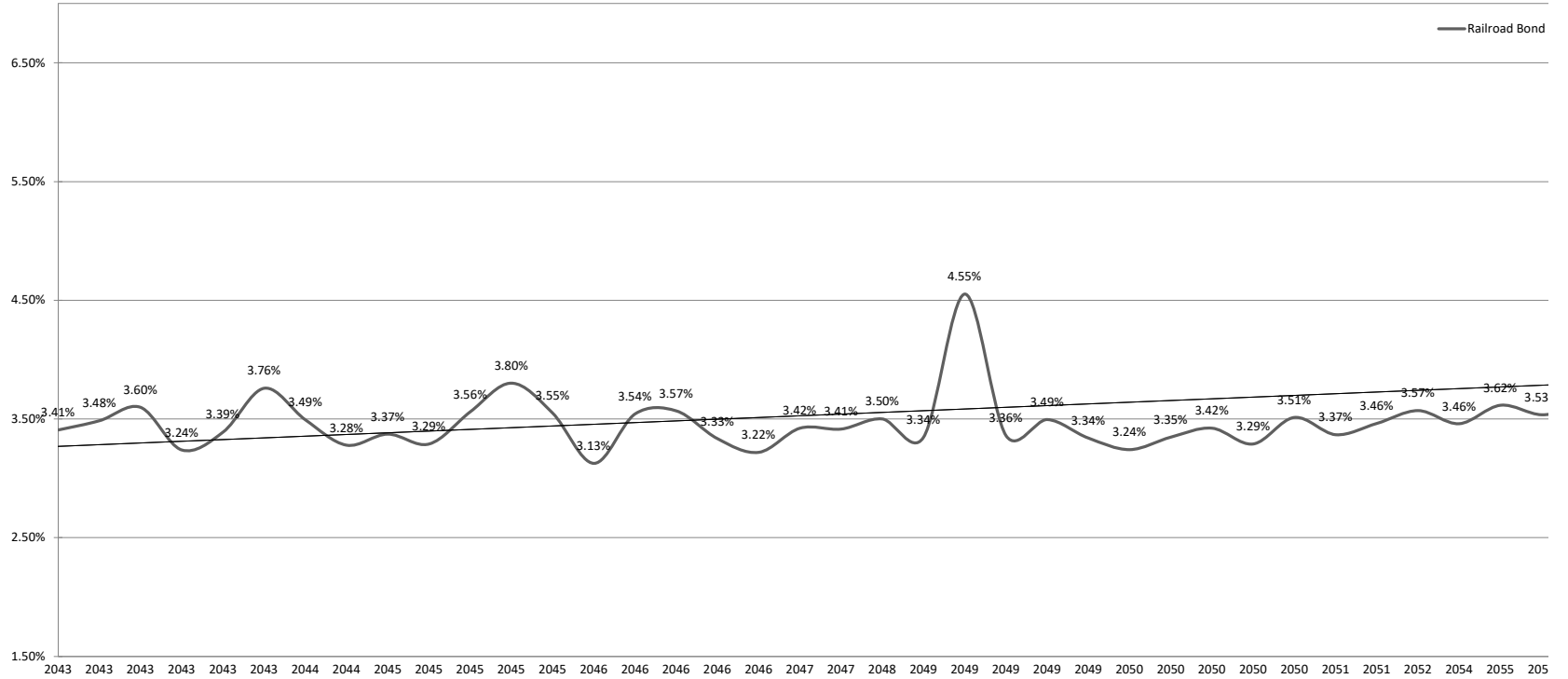
Company	type	Call	coupon	maturity	Price	Issued / Book	rent yield	YTM	Weighted Ave	S&P Rating	Mkt Val	Mkt : Book	Embedded Rate	Debt Service	WAYTM	WAYTM	Finra YTM
Canadian National	Deb (frgn)	NC	7.625	2023	107.70	\$ 300,000,000	7.08%	-6.97%	-0.03%	NR	\$ 323,100,000	107.70%		22,875,000	-0.000297	-0.00330	1.537
Canadian National			2.950	2024	102.59	\$ 350,000,000	2.88%	1.20%	0.01%	NR	\$ 359,065,000	102.59%		10,325,000	0.000059	0.00066	1.899
Canadian National			2.750	2026	102.69	\$ 500,000,000	2.68%	1.95%	0.01%	NR	\$ 513,450,000	102.69%		13,750,000	0.000138	0.00154	2.014
Canadian National	Notes (frgn)	Z100	6.900	2028	126.53	\$ 475,000,000	5.45%	1.79%	0.01%	NR	\$ 601,017,500	126.53%		32,775,000	0.000121	0.00135	2.434
Canadian National			7.375	2031	138.32	\$ 200,000,000	5.33%	2.35%	0.01%	NR	\$ 276,640,000	138.32%		14,750,000	0.000067	0.00074	2.825
Canadian National			6.250	2034	133.73	\$ 500,000,000	4.67%	2.78%	0.02%	NR	\$ 668,650,000	133.73%		31,250,000	0.000197	0.00220	2.992
Canadian National	Secured (fr)	Put-able	6.712	2036	140.72	\$ 250,000,000	4.77%	3.00%	0.01%	NR	\$ 351,800,000	140.72%		16,780,000	0.000106	0.00119	3.178
Canadian National			6.200	2036	135.70	\$ 450,000,000	4.57%	2.95%	0.02%	NR	\$ 610,650,000	135.70%		27,900,000	0.000189	0.00210	3.094
Canadian National	SR Notes		6.375	2037	137.36	\$ 300,000,000	4.64%	3.13%	0.01%	NR	\$ 412,080,000	137.36%		19,125,000	0.000133	0.00148	3.316
Canadian National	SR Notes		3.500	2042	99.35	\$ 250,000,000	3.52%	3.55%	0.01%	NR	\$ 248,375,000	99.35%		8,750,000	0.000126	0.00140	3.544
Canadian National	SR Notes		4.500	2043	115.95	\$ 250,000,000	3.88%	3.41%	0.01%	NR	\$ 289,875,000	115.95%		11,250,000	0.000121	0.00135	3.437
Canadian National	SR Notes		3.200	2046	101.22	\$ 650,000,000	3.16%	3.13%	0.03%	NR	\$ 657,930,000	101.22%		20,800,000	0.000288	0.00321	3.128
Canadian National	SR Notes		3.650	2048	106.84	\$ 600,000,000	3.42%	3.25%	0.03%	NR	\$ 641,040,000	106.84%		21,900,000	0.000277	0.00308	3.253
Canadian National	SR Notes		4.450	2049	119.24	\$ 650,000,000	3.73%	3.34%	0.03%	NR	\$ 775,060,000	119.24%		28,925,000	0.000308	0.00344	3.348
Canadian National	SR Notes		2.450	2050	85.72	\$ 600,000,000	2.86%	3.24%	0.03%	NR	\$ 514,320,000	85.72%		14,700,000	0.000276	0.00308	3.224
15			1500	sum	1753.66	\$ 6,325,000,000	Percent of 116.91%		0.21%		\$ 7,243,052,500	114.51%	4.68%	\$ 295,855,000		2.352%	
CSX Corp	Fixed Rt		3.700	2023	109.34	\$ 500,000,000	3.38%	-13.12%	-0.09%	NR	\$ 546,700,000	109.34%		18,500,000	-0.000931	-0.00434	0.091
CSX Corp	Fixed Rt		3.400	2024	104.00	\$ 550,000,000	3.27%	0.71%	0.01%	BBB+	\$ 572,000,000	104.00%		18,700,000	0.000055	0.00026	1.569
CSX Corp	Fixed Rt		3.350	2025	104.62	\$ 600,000,000	3.20%	1.45%	0.01%	BBB+	\$ 627,720,000	104.62%		20,100,000	0.000124	0.00058	1.972
CSX Corp			2.600	2026	101.75	\$ 700,000,000	2.56%	2.08%	0.02%	BBB+	\$ 712,250,000	101.75%		18,200,000	0.000206	0.00096	2.187
CSX Corp			3.250	2027	104.04	\$ 850,000,000	3.12%	2.29%	0.03%	BBB+	\$ 884,340,000	104.04%		27,625,000	0.000277	0.00129	2.398
CSX Corp			3.800	2028	106.12	\$ 800,000,000	3.58%	2.59%	0.03%	BBB+	\$ 848,960,000	106.12%		30,400,000	0.000294	0.00137	2.658
CSX Corp	MTN Ser C		6.800	2028	125.99	\$ 200,000,000	5.40%	1.80%	0.01%	BBB+	\$ 251,980,000	125.99%		13,600,000	0.000051	0.00024	2.618
CSX Corp			4.250	2029	109.14	\$ 350,000,000	3.89%	2.70%	0.01%	BBB+	\$ 381,990,000	109.14%		14,875,000	0.000134	0.00062	2.776
CSX Corp	SR Notes		2.400	2030	98.00	\$ 400,000,000	2.45%	2.70%	0.02%	BBB+	\$ 392,000,000	98.00%		9,600,000	0.000153	0.00071	2.679
CSX Corp	NOTES	Z100	6.000	2036	132.98	\$ 400,000,000	4.51%	2.99%	0.02%	BBB+	\$ 531,920,000	132.98%		24,000,000	0.000170	0.00079	3.17
CSX Corp	NOTES	Z100	6.150	2037	133.83	\$ 700,000,000	4.60%	3.20%	0.03%	BBB+	\$ 936,810,000	133.83%		43,050,000	0.000318	0.00148	3.305
CSX Corp	Fixed Rt nts		6.220	2040	135.91	\$ 660,000,000	4.58%	3.45%	0.03%	BBB+	\$ 897,006,000	135.91%		41,052,000	0.000323	0.00151	3.532
CSX Corp	NOTES		5.500	2041	126.44	\$ 550,000,000	4.35%	3.53%	0.03%	BBB+	\$ 695,420,000	126.44%		30,250,000	0.000275	0.00128	3.552
CSX Corp	NOTES		4.750	2042	119.10	\$ 600,000,000	3.99%	3.39%	0.03%	BBB+	\$ 714,600,000	119.10%		28,500,000	0.000289	0.00135	3.415
CSX Corp			4.400	2043	113.26	\$ 300,000,000	3.88%	3.48%	0.01%	BBB+	\$ 339,780,000	113.26%		13,200,000	0.000148	0.00069	3.491
CSX Corp	NOTES		4.100	2044	109.06	\$ 800,000,000	3.76%	3.49%	0.04%	BBB+	\$ 872,480,000	109.06%		32,800,000	0.000397	0.00185	3.499
CSX Corp			3.800	2046	104.07	\$ 800,000,001	3.65%	3.54%	0.04%	BBB+	\$ 832,560,001	104.07%		30,400,000	0.000402	0.00188	3.548
CSX Corp			4.750	2048	120.69	\$ 650,000,000	3.94%	3.51%	0.03%	BBB+	\$ 784,485,000	120.69%		30,875,000	0.000324	0.00151	3.534
CSX Corp			4.300	2048	112.88	\$ 850,000,000	3.81%	3.53%	0.04%	BBB+	\$ 959,480,000	112.88%		36,550,000	0.000425	0.00198	3.531
CSX Corp			4.500	2049	99.22	\$ 600,000,000	4.54%	4.55%	0.04%	BBB+	\$ 595,320,000	99.22%		27,000,000	0.000387	0.00181	3.394
CSX Corp	SR Notes		3.800	2050	108.04	\$ 500,000,000	3.52%	3.35%	0.02%	BBB+	\$ 540,200,000	108.04%		19,000,000	0.000238	0.00111	3.352
CSX Corp	FR SR Note		3.950	2050	109.30	\$ 600,000,000	3.61%	3.42%	0.03%	BBB+	\$ 655,800,000	109.30%		23,700,000	0.000291	0.00136	3.427
CSX Corp	SR Notes		2.500	2051	84.25	\$ 500,000,000	2.97%	3.37%	0.02%	BBB+	\$ 421,250,000	84.25%		12,500,000	0.000239	0.00111	3.348
CSX Corp	SR Notes		4.500	2054	119.74	\$ 450,000,000	3.76%	3.46%	0.02%	BBB+	\$ 538,830,000	119.74%		20,250,000	0.000221	0.00103	3.473
CSX Corp	SR Notes		4.250	2066	114.84	\$ 600,000,002	3.70%	3.57%	0.03%	BBB+	\$ 689,040,002	114.84%		25,500,000	0.000304	0.00142	3.579
CSX Corp	SR Notes		4.650	2068	116.20	\$ 600,000,003	4.00%	3.89%	0.03%	BBB+	\$ 697,200,003	116.20%		27,900,000	0.000331	0.00154	3.888
26			2600	sum	2922.81	\$ 15,110,000,006	% of book 112.42%		0.54%		\$ 16,920,121,007	111.98%	4.22%	\$ 638,127,000		2.540%	
Norfolk Southern	Notes		2.903	2023	101.09	\$ 586,000,000	2.87%	0.71%	0.01%	BBB+	\$ 592,387,400	101.09%		17,011,580	0.000059	0.00028	1.475
Norfolk Southern			3.850	2024	103.82	\$ 400,000,000	3.71%	1.26%	0.01%	BBB+	\$ 415,280,000	103.82%		15,400,000	0.000072	0.00033	1.544
Norfolk Southern			3.650	2025	104.73	\$ 300,000,000	3.49%	1.70%	0.01%	BBB+	\$ 314,190,000	104.73%		10,950,000	0.000124	0.00034	2.164
Norfolk Southern	Notes	Z100	5.590	2025	111.28	\$ 367,000,000	5.02%	1.00%	0.01%	BBB+	\$ 408,397,600	111.28%		20,515,300	0.000052	0.00024	2.024
Norfolk Southern			2.900	2026	102.82	\$ 600,000,000	2.82%	2.06%	0.02%	BBB+	\$ 616,920,000	102.82%		17,400,000	0.000175	0.00081	2.178
Norfolk Southern			3.150	2027	105.72	\$ 799,999,999	2.98%	1.81%	0.02%	BBB+	\$ 845,759,999	105.72%		25,200,000	0.000206	0.00096	1.961
Norfolk Southern	Notes	Z100	7.800	2027	125.37	\$ 800,000,000	6.22%	1.87%	0.02%	BBB+	\$ 1,002,960,000	125.37%		62,400,000	0.000212	0.00099	2.614
Norfolk Southern			3.800	2028	106.61	\$ 400,000,000	3.56%	2.50%	0.01%	BBB+	\$ 426,440,000	106.61%		15,200,000	0.000142	0.00066	2.643
Norfolk Southern			2.550	2029	100.42	\$ 400,000,000	2.54%	2.48%	0.01%	BBB+	\$ 401,680,000	100.42%		10,200,000	0.000141	0.00065	2.488
Norfolk Southern	Notes	Z100	5.640	2029	119.12	\$ 350,000,000	4.73%	2.43%	0.01%	BBB+	\$ 416,920,000	119.12%		19,740,000	0.000120	0.00056	2.740
Norfolk Southern	SR Notes	Z100	7.250	2031	136.46	\$ 700,000,000	5.31%	2.45%	0.02%	BBB+	\$ 955,220,000	136.46%		50,750,000	0.000243	0.00113	2.700
Norfolk Southern	Notes	Z100	7.050	2037	147.39	\$ 750,000,000	4.78%	2.98%	0.03%	BBB+	\$ 1,105,425,000	147.39%		52,875,000	0.000317	0.00147	3.184
Norfolk Southern	Notes		4.837	2041	119.83	\$ 596,000,000	4.04%	3.38%	0.03%	BBB+	\$ 714,186,800	119.83%		28,828,520	0.000286	0.00133	3.440
Norfolk Southern	SR NTS		3.950	2042	108.82	\$ 600,000,000	3.63%	3.33%	0.03%	BBB+	\$ 652,920,000	108.82%		23,700,000	0.000283	0.00132	3.345
Norfolk Southern	SR NTS		4.800	2043	117.23	\$ 500,000,000	4.09%	3.60%	0.03%	BBB+	\$ 586,150,000	117.23%		24,000,000	0.000255	0.00119	3.622
Norfolk Southern	FR SR Note		4.450														

Norfolk Southern	FR SR Note Z100	6.000	2105	138.96	\$	550,000,000	4.32%	4.28%	0.03%	BBB+	\$	764,280,000	138.96%		33,000,000	0.000334	0.00155	4.281
Norfolk Southern	SR NOTES	5.100	2118	123.22	\$	600,000,000	4.14%	4.12%	0.04%	BBB+	\$	739,320,000	123.22%		30,600,000	0.000351	0.00163	4.123
	27	2700	sum	3116.53	\$	15,148,158,999	% of book 115.43%		0.62%		\$	17,414,154,745	114.96%	4.59%	\$	695,867,273	2.899%	
Union Pacific Corp		2.750	2023	101.30	\$	325,000,000	2.71%	0.15%	0.00%	A-	\$	329,225,000	101.30%		8,937,500	0.000007	0.00002	1.353
Union Pacific Corp		3.500	2023	102.66	\$	650,000,000	3.41%	-1.75%	-0.02%	A-	\$	667,290,000	102.66%		22,750,000	-0.000161	-0.00045	1.350
Union Pacific Corp		2.950	2023	101.40	\$	300,000,000	2.91%	0.15%	0.00%	A-	\$	304,200,000	101.40%		8,850,000	0.000006	0.00002	0.907
Union Pacific Corp		3.750	2024	104.12	\$	400,000,000	3.60%	0.97%	0.01%	A-	\$	416,480,000	104.12%		15,000,000	0.000055	0.00016	1.488
Union Pacific Corp		3.150	2024	103.04	\$	500,000,000	3.06%	1.10%	0.01%	A-	\$	515,200,000	103.04%		15,750,000	0.000078	0.00022	1.587
Union Pacific Corp		3.646	2024	103.34	\$	439,192,000	3.53%	1.38%	0.01%	A-	\$	453,861,013	103.34%		16,012,940	0.000086	0.00024	1.724
Union Pacific Corp		3.750	2025	106.02	\$	500,000,000	3.54%	1.29%	0.01%	A-	\$	530,100,000	106.02%		18,750,000	0.000091	0.00026	1.846
Union Pacific Corp	FR Note	3.250	2025	104.47	\$	500,000,000	3.11%	1.42%	0.01%	A-	\$	522,350,000	104.47%		16,250,000	0.000101	0.00028	1.837
Union Pacific Corp		2.750	2026	102.22	\$	500,000,000	2.69%	2.09%	0.01%	A-	\$	511,100,000	102.22%		13,750,000	0.000148	0.00042	2.142
Union Pacific Corp		3.000	2027	103.74	\$	500,000,000	2.89%	2.12%	0.02%	A-	\$	518,700,000	103.74%		15,000,000	0.000150	0.00042	2.197
Union Pacific Corp	SR NOTES	2.150	2027	99.68	\$	500,000,000	2.16%	2.23%	0.02%	A-	\$	498,400,000	99.68%		10,750,000	0.000158	0.00045	2.219
Union Pacific Corp	Deb NC	3.950	2028	107.94	\$	1,500,000,000	3.66%	2.39%	0.05%	A-	\$	1,619,100,000	107.94%		59,250,000	0.000509	0.00144	2.584
Union Pacific Corp		3.700	2029	106.68	\$	1,000,000,000	3.47%	2.57%	0.04%	A-	\$	1,066,800,000	106.68%		37,000,000	0.000365	0.00103	2.623
Union Pacific Corp	Deb Z100	6.625	2029	125.88	\$	600,000,000	5.26%	2.29%	0.02%	A-	\$	755,280,000	125.88%		39,750,000	0.000195	0.00055	2.553
Union Pacific Corp	SR NOTES	2.400	2030	105.95	\$	750,000,000	2.27%	1.55%	0.02%	A-	\$	794,625,000	105.95%		18,000,000	0.000165	0.00047	1.665
Union Pacific Corp		5.375	2033	120.89	\$	200,000,000	4.45%	3.02%	0.01%	A-	\$	241,780,000	120.89%		10,750,000	0.000086	0.00024	3.166
Union Pacific Corp	SR NOTES Z100	6.250	2034	131.14	\$	250,000,000	4.77%	3.01%	0.01%	A-	\$	327,850,000	131.14%		15,625,000	0.000107	0.00030	3.166
Union Pacific Corp		3.375	2035	105.91	\$	450,000,000	3.19%	2.81%	0.02%	A-	\$	476,595,000	105.91%		15,187,500	0.000179	0.00051	2.810
Union Pacific Corp		3.600	2037	106.06	\$	500,000,000	3.39%	3.08%	0.02%	A-	\$	530,300,000	106.06%		18,000,000	0.000218	0.00063	3.095
Union Pacific Corp	Deb	6.150	2037	147.03	\$	250,000,000	4.18%	2.30%	0.01%	A-	\$	367,575,000	147.03%		15,375,000	0.000082	0.00023	2.596
Union Pacific Corp		4.375	2038	111.03	\$	750,000,000	3.94%	3.44%	0.04%	A-	\$	832,725,000	111.03%		32,812,500	0.000367	0.00103	3.475
Union Pacific Corp		3.550	2039	103.60	\$	500,000,000	3.43%	3.26%	0.02%	A-	\$	518,000,000	103.60%		17,750,000	0.000232	0.00065	3.272
Union Pacific Corp		5.780	2040	128.37	\$	375,890,000	4.50%	3.57%	0.02%	A-	\$	482,529,993	128.37%		21,726,442	0.000191	0.00054	3.715
Union Pacific Corp	SR NOTES	4.750	2041	123.78	\$	500,000,000	3.84%	3.05%	0.02%	A-	\$	618,900,000	123.78%		23,750,000	0.000216	0.00061	3.102
Union Pacific Corp		4.300	2042	114.23	\$	300,000,000	3.76%	3.30%	0.01%	A-	\$	342,690,000	114.23%		12,900,000	0.000140	0.00040	3.318
Union Pacific Corp		4.250	2043	114.96	\$	325,000,000	3.70%	3.24%	0.01%	A-	\$	373,620,000	114.96%		13,812,500	0.000149	0.00042	3.254
Union Pacific Corp	Fixed Rate	4.750	2043	119.88	\$	500,000,000	3.96%	3.39%	0.02%	A-	\$	599,400,000	119.88%		23,750,000	0.000240	0.00068	3.431
Union Pacific Corp	Fixed Rate	4.821	2044	123.54	\$	700,000,000	3.90%	3.28%	0.03%	A-	\$	864,780,000	123.54%		33,747,000	0.000326	0.00092	3.290
Union Pacific Corp	Fixed Rate	4.050	2045	111.98	\$	500,000,000	3.62%	3.29%	0.02%	A-	\$	559,900,000	111.98%		20,250,000	0.000233	0.00066	3.308
Union Pacific Corp	SR NOTES	4.150	2045	109.04	\$	350,000,000	3.81%	3.56%	0.02%	A-	\$	381,640,000	109.04%		14,525,000	0.000177	0.00050	3.562
Union Pacific Corp	SR NOTES	4.050	2046	111.54	\$	600,000,000	3.63%	3.33%	0.03%	A-	\$	669,240,000	111.54%		24,300,000	0.000284	0.00080	3.339
Union Pacific Corp	SR NOTES	3.350	2046	102.15	\$	300,000,000	3.28%	3.22%	0.01%	A-	\$	306,450,000	102.15%		10,050,000	0.000137	0.00039	3.221
Union Pacific Corp	SR NOTES	4.000	2047	109.61	\$	500,000,000	3.65%	3.41%	0.02%	A-	\$	548,050,000	109.61%		20,000,000	0.000242	0.00068	3.420
Union Pacific Corp	SR NOTES	4.500	2048	118.25	\$	1,500,000,000	3.81%	3.42%	0.07%	A-	\$	1,773,750,000	118.25%		67,500,000	0.000727	0.00205	3.435
Union Pacific Corp		4.300	2049	116.73	\$	1,000,000,000	3.68%	3.34%	0.05%	A-	\$	1,167,300,000	116.73%		43,000,000	0.000474	0.00134	3.345
Union Pacific Corp	SR NOTES	3.799	2051	106.03	\$	1,044,261,000	3.58%	3.46%	0.05%	A-	\$	1,107,229,938	106.03%		39,671,475	0.000513	0.00145	3.468
Union Pacific Corp	SR NOTES	3.875	2055	106.51	\$	450,000,000	3.64%	3.53%	0.02%	A-	\$	479,295,000	106.51%		17,437,500	0.000226	0.00064	3.536
Union Pacific Corp		3.950	2059	106.98	\$	500,000,000	3.69%	3.60%	0.03%	A-	\$	534,900,000	106.98%		19,750,000	0.000256	0.00072	3.607
Union Pacific Corp		3.839	2060	104.75	\$	1,841,766,000	3.66%	3.61%	0.09%	A-	\$	1,929,249,885	104.75%		70,705,397	0.000942	0.00266	3.607
Union Pacific Corp	SR NOTES	4.375	2065	112.58	\$	600,000,000	3.89%	3.78%	0.03%	A-	\$	675,480,000	112.58%		26,250,000	0.000321	0.00091	3.782
Union Pacific Corp	SR NOTES	4.100	2067	111.13	\$	500,000,000	3.69%	3.59%	0.03%	A-	\$	555,650,000	111.13%		20,500,000	0.000255	0.00072	3.599
Union Pacific Corp	SR NOTES	3.750	2070	102.67	\$	750,000,000	3.65%	3.63%	0.04%	A-	\$	770,025,000	102.67%		28,125,000	0.000386	0.00109	3.632
	42 Book Value 4200		sum	4658.81	\$	25,001,109,000	% of book 110.92%		0.97%		\$	27,537,615,829	110.15%	3.97%	\$	993,050,754	2.723%	
Kansas City Southern		3.000	2023	101.51	\$	439,123,000	2.96%	-0.02%	0.00%	BBB	\$	445,753,757	101.51%		13,173,690	-0.000001	-0.00003	1.504
Kansas City Southern		2.875	2029	100.45	\$	425,000,000	2.86%	2.80%	0.02%	BBB	\$	426,912,500	100.45%		12,218,750	0.000169	0.00032	2.808
Kansas City Southern	SR NOTES	4.300	2043	107.63	\$	448,651,000	4.00%	3.76%	0.02%	BBB	\$	482,883,071	107.63%		19,291,993	0.000239	0.00513	3.767
Kansas City Southern	SR NOTES	4.950	2045	117.15	\$	499,165,000	4.23%	3.80%	0.03%	BBB	\$	584,771,798	117.15%		24,708,668	0.000269	0.00577	3.823
Kansas City Southern		4.700	2048	120.01	\$	500,000,000	3.92%	3.50%	0.02%	BBB	\$	600,050,000	120.01%		23,500,000	0.000248	0.00533	3.512
Kansas City Southern	SR NOTES	3.500	2050	99.78	\$	550,000,000	3.51%	3.51%	0.03%	BBB	\$	548,790,000	99.78%		19,250,000	0.000274	0.00588	3.512
Kansas City Southern		4.200	2069	108.82	\$	425,000,000	3.86%	3.79%	0.02%	BBB	\$	462,485,000	108.82%		17,850,000	0.000229	0.00490	3.797
	7 Book Value 700		sum	755.35	\$	3,286,939,000	% of book 107.91%		0.14%		\$	3,551,646,126	108.05%	3.95%	\$	129,993,101	3.061%	
Canadian Pacific	Deb (foreign) NC	4.500	2022	100.05	\$	250,000,000	4.50%	4.60%	0.02%	AA-	\$	250,125,000	100.05%		11,250,000	0.000163	0.00205	0.88
Canadian Pacific	SR NOTES	4.450	2023	102.67	\$	350,000,000	4.33%	-0.86%	0.00%	AA-	\$	359,345,000	102.67%		15,575,000	-0.000042	-0.00053	1.333
Canadian Pacific	SR NOTES	2.900	2025	102.53	\$	700,000,000	2.83%	1.85%	0.02%	AA-	\$	717,710,000	102.53%		20,300,000	0.000184	0.00232	1.944
Canadian Pacific	SR NOTES	3.700	2026	105.47	\$	250,000,000	3.51%	2.06%	0.01%	AA-	\$	263,675,000	105.47%		9,250,000	0.000073	0.00092	2.166
Canadian Pacific	SR NOTES	4.000	2028	108.98	\$	500,000,000	3.67%	2.25%	0.02%	AA-	\$	544,900,000	108.98%		20,000,000	0.000159	0.00201	2.401
Canadian Pacific	SR NOTES	2.050	2030	95.81	\$	500,000,000	2.14%	2.67%	0.02%	AA-	\$	479,050,000	95.81%		10,250,000	0.000190	0.00239	2.629
Canadian Pacific	SR NOTES	7.125	2031	135.93	\$	350,000,000	5.24%	2.40%	0.01%	AA-	\$	475,755,000	135.93%		24,937,500	0.000119	0.00150	2.859
Canadian Pacific	SR NOTES	5.750	2033	123.96	\$	250,000,000	4.64%	3.05%	0.01%	AA-	\$	309,900,000	123.96%		14,375,000	0.000108	0.00136	3.172
Canadian Pacific	SR NOTES	4.800	2035	118.43	\$	300,000,000	4.05%	3.01%	0.01%	AA-	\$	355,290,000	118.43%		14,400,000	0.000128	0.00161	3.081
Canadian Pacific	SR NOTES	5.950	2037	129.38	\$	450,000,000	4.60%	3.36%	0.02%	AA-	\$	582,210,000	129.38%		26,775,000	0.000214	0.00270	3.457
Canadian Pacific	SR NOTES	5.750	2042	131.02	\$	250,000,000	4.39%	3										

Source: Finra

Embedded debt rate 4.28%
 Weighted average yield to maturity 2.73%
 Debt service / Market value 3.82%

20+ Year, All Ratings, Railroad Bond Analysis



12/31/2021

Railroad Bond Analysis

Company	type	Call	coupon	maturity	Price	Issued / Book	current yield	yield to matu	Weighted Ave Rating	Mkt Val	Mkt : Book	Embedded Rat	Debt Service	WAYTM	WAYTM	Finra YTM
Canadian National	SR Notes		4.500	2043	115.95	\$ 250,000,000	3.88%	3.41%	0.01%	NR	\$ 289,875,000	115.95%	11,250,000	0.000121	0.00135	3.437
CSX Corp			4.400	2043	113.26	\$ 300,000,000	3.88%	3.48%	0.01%	BBB+	\$ 339,780,000	113.26%	13,200,000	0.000148	0.00069	3.491
Norfolk Southern	SR NTS		4.800	2043	117.23	\$ 500,000,000	4.09%	3.60%	0.03%	BBB+	\$ 586,150,000	117.23%	24,000,000	0.000255	0.00119	3.622
Union Pacific Corp			4.250	2043	114.96	\$ 325,000,000	3.70%	3.24%	0.01%	A-	\$ 373,620,000	114.96%	13,812,500	0.000149	0.00042	3.254
Union Pacific Corp	Fixed Rate		4.750	2043	119.88	\$ 500,000,000	3.96%	3.39%	0.02%	A-	\$ 599,400,000	119.88%	23,750,000	0.000240	0.00068	3.431
Kansas City																
Southern	SR NOTES		4.300	2043	107.63	\$ 448,651,000	4.00%	3.76%	0.02%	BBB	\$ 482,883,071	107.63%	19,291,993	0.000239	0.00513	3.767
CSX Corp	NOTES		4.100	2044	109.06	\$ 800,000,000	3.76%	3.49%	0.04%	BBB+	\$ 872,480,000	109.06%	32,800,000	0.000397	0.00185	3.499
Union Pacific Corp	Fixed Rate		4.821	2044	123.54	\$ 700,000,000	3.90%	3.28%	0.03%	A-	\$ 864,780,000	123.54%	33,747,000	0.000326	0.00092	3.29
Norfolk Southern	FR SR Note		4.450	2045	116.79	\$ 500,000,000	3.81%	3.37%	0.02%	BBB+	\$ 583,950,000	116.79%	22,250,000	0.000239	0.00111	3.389
Union Pacific Corp	Fixed Rate		4.050	2045	111.98	\$ 500,000,000	3.62%	3.29%	0.02%	A-	\$ 559,900,000	111.98%	20,250,000	0.000233	0.00066	3.308
Union Pacific Corp	SR NOTES		4.150	2045	109.04	\$ 350,000,000	3.81%	3.56%	0.02%	A-	\$ 381,640,000	109.04%	14,525,000	0.000177	0.00050	3.562
Kansas City																
Southern	SR NOTES		4.950	2045	117.15	\$ 499,165,000	4.23%	3.80%	0.03%	BBB	\$ 584,771,798	117.15%	24,708,668	0.000269	0.00577	3.823

Canadian Pacific	SR NOTES	4.800	2045	119.14	\$	550,000,000	4.03%	3.55%	0.03%	AA-	\$	655,270,000	119.14%	26,400,000	0.000277	0.00349	3.572
Canadian National	SR Notes	3.200	2046	101.22	\$	650,000,000	3.16%	3.13%	0.03%	NR	\$	657,930,000	101.22%	20,800,000	0.000288	0.00321	3.128
CSX Corp		3.800	2046	104.07	\$	800,000,001	3.65%	3.54%	0.04%	BBB+	\$	832,560,001	104.07%	30,400,000	0.000402	0.00188	3.548
Norfolk Southern	FR SR Note	4.650	2046	117.00	\$	600,000,000	3.97%	3.57%	0.03%	BBB+	\$	702,000,000	117.00%	27,900,000	0.000304	0.00141	3.573
Union Pacific Corp	SR NOTES	4.050	2046	111.54	\$	600,000,000	3.63%	3.33%	0.03%	A-	\$	669,240,000	111.54%	24,300,000	0.000284	0.00080	3.339
Union Pacific Corp	SR NOTES	3.350	2046	102.15	\$	300,000,000	3.28%	3.22%	0.01%	A-	\$	306,450,000	102.15%	10,050,000	0.000137	0.00039	3.221
Norfolk Southern		3.942	2047	108.53	\$	749,169,000	3.63%	3.42%	0.04%	BBB+	\$	813,073,116	108.53%	29,532,242	0.000364	0.00169	3.434
Union Pacific Corp	SR NOTES	4.000	2047	109.61	\$	500,000,000	3.65%	3.41%	0.02%	A-	\$	548,050,000	109.61%	20,000,000	0.000242	0.00068	3.42
Kansas City																	
Southern		4.700	2048	120.01	\$	500,000,000	3.92%	3.50%	0.02%	BBB	\$	600,050,000	120.01%	23,500,000	0.000248	0.00533	3.512
Canadian National	SR Notes	4.450	2049	119.24	\$	650,000,000	3.73%	3.34%	0.03%	NR	\$	775,060,000	119.24%	28,925,000	0.000308	0.00344	3.348
CSX Corp		4.500	2049	99.22	\$	600,000,000	4.54%	4.55%	0.04%	BBB+	\$	595,320,000	99.22%	27,000,000	0.000387	0.00181	3.394
Norfolk Southern		3.400	2049	100.68	\$	400,000,000	3.38%	3.36%	0.02%	BBB+	\$	402,720,000	100.68%	13,600,000	0.000191	0.00089	3.361
Norfolk Southern		4.100	2049	110.35	\$	400,000,000	3.72%	3.49%	0.02%	BBB+	\$	441,400,000	110.35%	16,400,000	0.000198	0.00092	3.501
Union Pacific Corp		4.300	2049	116.73	\$	1,000,000,000	3.68%	3.34%	0.05%	A-	\$	1,167,300,000	116.73%	43,000,000	0.000474	0.00134	3.345
Canadian National	SR Notes	2.450	2050	85.72	\$	600,000,000	2.86%	3.24%	0.03%	NR	\$	514,320,000	85.72%	14,700,000	0.000276	0.00308	3.224
CSX Corp	SR Notes	3.800	2050	108.04	\$	500,000,000	3.52%	3.35%	0.02%	BBB+	\$	540,200,000	108.04%	19,000,000	0.000238	0.00111	3.352
CSX Corp	FR SR Note	3.950	2050	109.30	\$	600,000,000	3.61%	3.42%	0.03%	BBB+	\$	655,800,000	109.30%	23,700,000	0.000291	0.00136	3.427
Norfolk Southern	SR Notes	3.050	2050	95.73	\$	800,000,000	3.19%	3.29%	0.04%	BBB+	\$	765,840,000	95.73%	24,400,000	0.000373	0.00174	3.283
Kansas City																	
Southern	SR NOTES	3.500	2050	99.78	\$	550,000,000	3.51%	3.51%	0.03%	BBB	\$	548,790,000	99.78%	19,250,000	0.000274	0.00588	3.512
CSX Corp	SR Notes	2.500	2051	84.25	\$	500,000,000	2.97%	3.37%	0.02%	BBB+	\$	421,250,000	84.25%	12,500,000	0.000239	0.00111	3.348
Union Pacific Corp	SR NOTES	3.799	2051	106.03	\$	1,044,261,000	3.58%	3.46%	0.05%	A-	\$	1,107,229,938	106.03%	39,671,475	0.000513	0.00145	3.468
Norfolk Southern		4.050	2052	108.66	\$	749,994,000	3.73%	3.57%	0.04%	BBB+	\$	814,943,480	108.66%	30,374,757	0.000380	0.00177	3.577
CSX Corp	SR Notes	4.500	2054	119.74	\$	450,000,000	3.76%	3.46%	0.02%	BBB+	\$	538,830,000	119.74%	20,250,000	0.000221	0.00103	3.473
Norfolk Southern	SR Notes	3.155	2055	91.26	\$	799,996,000	3.46%	3.62%	0.04%	BBB+	\$	730,076,350	91.26%	25,239,874	0.000411	0.00191	3.608
Union Pacific Corp	SR NOTES	3.875	2055	106.51	\$	450,000,000	3.64%	3.53%	0.02%	A-	\$	479,295,000	106.51%	17,437,500	0.000226	0.00064	3.536
Union Pacific Corp		3.950	2059	106.98	\$	500,000,000	3.69%	3.60%	0.03%	A-	\$	534,900,000	106.98%	19,750,000	0.000256	0.00072	3.607
Union Pacific Corp		3.839	2060	104.75	\$	1,841,766,000	3.66%	3.61%	0.09%	A-	\$	1,929,249,885	104.75%	70,705,397	0.000942	0.00266	3.607
Union Pacific Corp	SR NOTES	4.375	2065	112.58	\$	600,000,000	3.89%	3.78%	0.03%	A-	\$	675,480,000	112.58%	26,250,000	0.000321	0.00091	3.782
CSX Corp	SR Notes	4.250	2066	114.84	\$	600,000,002	3.70%	3.57%	0.03%	BBB+	\$	689,040,002	114.84%	25,500,000	0.000304	0.00142	3.579
Union Pacific Corp	SR NOTES	4.100	2067	111.13	\$	500,000,000	3.69%	3.59%	0.03%	A-	\$	555,650,000	111.13%	20,500,000	0.000255	0.00072	3.599
CSX Corp	SR Notes	4.650	2068	116.20	\$	600,000,003	4.00%	3.89%	0.03%	BBB+	\$	697,200,003	116.20%	27,900,000	0.000331	0.00154	3.888
Kansas City																	
Southern		4.200	2069	108.82	\$	425,000,000	3.86%	3.79%	0.02%	BBB	\$	462,485,000	108.82%	17,850,000	0.000229	0.00490	3.797
Union Pacific Corp	SR NOTES	3.750	2070	102.67	\$	750,000,000	3.65%	3.63%	0.04%	A-	\$	770,025,000	102.67%	28,125,000	0.000386	0.00109	3.632
Norfolk Southern	Notes Z100	7.900	2097	180.99	\$	350,000,000	4.36%	4.28%	0.02%	BBB+	\$	633,465,000	180.99%	27,650,000	0.000212	0.00099	4.283
Norfolk Southern	FR SR Note Z100	6.000	2105	138.96	\$	550,000,000	4.32%	4.28%	0.03%	BBB+	\$	764,280,000	138.96%	33,000,000	0.000334	0.00155	4.281
Norfolk Southern	SR NOTES	5.100	2118	123.22	\$	600,000,000	4.14%	4.12%	0.04%	BBB+	\$	739,320,000	123.22%	30,600,000	0.000351	0.00163	4.123
Canadian Pacific	SR NOTES	6.125	2115	108.82	\$	900,000,000	5.63%	5.63%	0.07%	AA-	\$	979,380,000	108.82%	55,125,000	0.000718	0.00904	3.797

Total	\$	29,233,002,006	Total	\$	32,232,702,645	110.26%	4.19%	\$	1,224,871,406	2.729%	9.577%	3.538
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Source: Finra

Embedded debt rate	4.19%
Weighted average yield to maturity	2.73%
Debt service / Market value	3.80%
Finra YTM	3.54%
SAY	3.50%

DATA INPUT

WASHINGTON STATE DEPARTMENT OF REVENUE

2022 ASSESSMENT YEAR

RAILROADS

Instructions: Data entered on this page will flow to the applicable worksheets.

Guideline Companies		Current Year										Next Year	
		Stock Price 12/31/2021	Beta levered	Revenues Per Share	Cash Flow Per Share	Earnings Per Share	Dividends Per Share	Book Value	Common Shares	Long-Term Debt	Operating Margin	Revenues Per Share	Cash Flow Per Share
Name	Ticker	Yahoo	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL
Union Pacific Corp.	UNP	\$251.93	1.10	\$ 34.20	\$ 13.80	\$ 9.95	\$ 4.20	\$ 23.15	642,875	\$ 27,560,000,000	53.5%	\$ 37.60	\$ 15.30
Norfolk Southern Corp.	NSC	\$297.71	1.10	\$ 45.90	\$ 17.25	\$ 12.10	\$ 4.16	\$ 58.45	243,344	\$ 13,274,000,000	50.0%	\$ 50.20	\$ 18.90
CSX Corp.	CSX	\$37.49	1.05	\$ 5.60	\$ 2.20	\$ 1.55	\$ 0.37	\$ 5.90	2,250,000	\$ 16,229,000,000	53.0%	\$ 6.25	\$ 2.50
Canadian National	CNI	\$122.86	0.85	\$ 16.60	\$ 6.60	\$ 4.70	\$ 1.87	\$ 23.40	710,400	\$ 9,865,000,000	50.0%	\$ 18.40	\$ 7.55
Canadian Pacific	CP	\$71.94	1.00	\$ 9.75	\$ 4.10	\$ 3.15	\$ 0.60	\$ 10.95	669,800	\$ 6,428,000,000	53.0%	\$ 10.75	\$ 4.65

Value Line Issue: [November 19, 2021](#)

The harmonic mean is the preferable method for averaging multiples, such as the price/earning multiples, in which price is in the numerator. If these ratios are averaged using an arithmetic mean (a common error), High data points are given greater weights than low data points.

The harmonic mean, on the other hand, gives equal weight to each data point

Note:

Canadian Exchange Rate: **0.8000**

Value Line figures are all values in US dollars.

						Year 5								Revenues
Earnings Per Share	Dividends Per Share	Common Shares	% Return on Shareholders' Equity	% Retained to Common Equity	All Dividends to Net Profits	Revenues Per Share	Cash Flow Per Share	Earnings Per Share	Dividends Per Share	Common Shares	% Return on Shareholders Equity	% Retained to Common Equity	All Dividends to Net Profits	2021-2025
VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL	VL
\$ 11.60	\$ 4.40	620,000	52.5%	33.0%	39.0%	\$ 45.20	\$ 18.85	\$ 14.50	\$ 5.20	575,000	57.5%	37.0%	36.0%	6.50%
\$ 13.85	\$ 4.58	239,000	22.0%	14.5%	34.0%	\$ 60.90	\$ 23.30	\$ 17.50	\$ 5.80	220,000	24.5%	15.5%	33.0%	6.50%
\$ 1.75	\$ 0.40	2,130,000	28.0%	21.5%	23.0%	\$ 8.35	\$ 3.45	\$ 2.50	\$ 0.60	1,800,000	39.0%	30.0%	25.0%	9.00%
\$ 5.65	\$ 2.00	680,000	25.0%	16.0%	35.0%	\$ 22.90	\$ 9.30	\$ 7.00	\$ 2.40	640,000	31.5%	20.5%	34.0%	6.50%
\$ 3.60	\$ 0.68	670,000	26.5%	21.5%	19.0%	\$ 12.50	\$ 5.55	\$ 4.45	\$ 0.85	655,000	20.5%	16.5%	19.0%	6.50%

Cash Flow	Earnings	Dividends	Income	Balance Sheet					Cash Flow	
2021-2025	2021-2025	2021-2025	Operating Income	Current Assets	PP & E Gross	Current Liabilities	Long Term Debt	Intangibles (excluding Goodwill)	Depreciation & Amortization	Net Share Repurchases
VL	VL	VL	M*	M*	M*	M*	M*	M*	M*	10-K
8.50%	10.00%	6.00%	\$ 9,338,000,000	\$ 3,551,000,000	\$ 79,062,000,000	\$ 5,744,000,000	\$ 27,319,000,000	\$ -	\$ 2,208,000,000	\$ 7,291,000,000
8.50%	10.50%	9.00%	\$ 4,714,000,000	\$ 2,167,000,000	\$ 43,684,000,000	\$ 2,521,000,000	\$ 13,287,000,000	\$ -	\$ 1,181,000,000	\$ 3,400,000,000
10.50%	11.50%	11.00%	\$ 5,140,000,000	\$ 3,873,000,000	\$ 47,006,000,000	\$ 2,233,000,000	\$ 16,185,000,000	\$ 175,000,000	\$ 1,420,000,000	\$ 2,886,000,000
7.50%	8.50%	7.00%	\$ 4,855,200,000	\$ 2,740,800,000	\$ 45,372,800,000	\$ 2,496,000,000	\$ 9,581,600,000	\$ 111,200,000	\$ 1,278,400,000	\$ 1,265,600,000
8.50%	9.50%	11.50%	\$ 2,593,600,000	\$ 1,081,600,000	\$ 24,110,400,000	\$ 2,527,200,000	\$ 14,861,600,000	\$ 34,400,000	\$ 648,800,000	

Fair Value	Carrying Value	Operating Lease	ROE	All Div'ds to Net Prof
Debt	Debt	Rent	5 yr	5 yr
10-k	10-k	10-k	VL	VL
\$ 31,416,000,000	\$ 29,729,000,000	\$ 428,000,000	57.5%	36%
\$ 17,033,000,000	\$ 13,840,000,000	\$ 159,000,000	24.5%	33%
\$ 19,439,000,000	\$ 16,366,000,000	\$ 89,000,000	39.0%	25%
\$ 11,539,200,000	\$ 9,980,000,000	\$ 182,400,000	31.5%	34%
\$ 17,012,000,000	\$ 15,320,800,000	\$ 89,600,000	20.5%	19%

SUPPORT FOR DIRECT CAPITALIZATION EQUITY COMPONENT

WASHINGTON STATE DEPARTMENT OF REVENUE

2022 ASSESSMENT YEAR

RAILROADS

Company	Ticker	Stock Price	2021		2022		2021		2022	
			Actual Earnings Ratio (EPS/P)		Projected Earnings Ratio (PEPS/P)		Cash Flow Ratio (CF/P)		Projected Cash Flow Ratio (PCF/P)	
Union Pacific Corp.	UNP	251.93	9.95	3.95%	11.60	4.60%	13.80	5.48%	15.30	6.07%
Norfolk Southern Corp.	NSC	297.71	12.10	4.06%	13.85	4.65%	17.25	5.79%	18.90	6.35%
CSX Corp.	CSX	37.49	1.55	4.13%	1.75	4.67%	2.20	5.87%	2.50	6.67%
Canadian National	CNI	122.86	4.70	3.83%	5.65	4.60%	6.60	5.37%	7.55	6.15%
Canadian Pacific	CP	71.94	3.15	4.38%	3.60	5.00%	4.10	5.70%	4.65	6.46%
		Mean		4.07%		4.71%		5.64%		6.34%
		Median		4.06%		4.65%		5.70%		6.35%
		Max		4.38%		4.67%		5.87%		6.67%
		Min		3.83%		4.60%		5.37%		6.07%
		stdev		0.00		0.00		0.00		0.00
		cov		0.05		0.04		0.04		0.04
		harmean		4.06%		4.70%		5.64%		6.33%
Source:		Say		4.00%		4.75%		5.75%		6.50%

Actual earnings: Value Line / Q4 Year End stock price

Estimated Earnings: Value Line / Q4 Year End stock price

Actual Cash Flow: Value Line / Q4 Year End stock price

Estimated Cash Flow: Value Line / Q4 Year End stock price

IMPLIED PREMIUMS FOR US MARKET

Updated January 2022

Source: <http://pages.stern.nyu.edu/~adamodar/>

These implied premiums are calculated using the S&P 500.

Year	Earnings Yield	Dividend Yield	S&P 500	Earnings*	Dividends*	Dividends + Buybacks	Change in Earnings	Change in Dividends	T-Bill Rate	T-Bond Rate	Bond-Bill	Boothed Growth	Premium	Analyst Growth Estimate	Implied Premium (FC)	Implied Premium
1960	5.34%	3.41%	58.11	3.10	1.98				2.66%	2.76%	0.10%	2.45%				
1961	4.71%	2.85%	71.55	3.37	2.04		8.60%	2.91%	2.13%	3.35%	0.22%	2.41%	2.92%			2.92%
1962	5.81%	3.40%	63.1	3.67	2.15		8.79%	5.21%	2.73%	3.85%	1.12%	4.05%	3.56%			3.56%
1963	5.51%	3.13%	75.02	4.13	2.35		12.75%	9.45%	3.12%	4.14%	1.02%	4.96%	3.38%			3.38%
1964	5.62%	3.05%	84.75	4.76	2.58		15.23%	10.08%	3.54%	4.21%	0.67%	5.13%	3.31%			3.31%
1965	5.73%	3.06%	92.43	5.30	2.83		11.20%	9.42%	3.93%	4.65%	0.72%	5.46%	3.32%			3.32%
1966	6.74%	3.59%	80.33	5.41	2.88		2.23%	1.96%	4.76%	4.64%	-0.12%	4.19%	3.68%			3.68%
1967	5.66%	3.09%	96.47	5.46	2.98		0.85%	3.37%	4.21%	5.70%	1.49%	5.25%	3.20%			3.20%
1968	5.51%	2.93%	103.86	5.72	3.04		4.81%	2.09%	5.21%	6.16%	0.95%	5.32%	3.00%			3.00%
1969	6.63%	3.52%	92.06	6.10	3.24		6.66%	6.49%	6.58%	7.88%	1.30%	7.55%	3.74%			3.74%
1970	5.98%	3.46%	92.15	5.51	3.19		-9.72%	-1.61%	6.53%	6.50%	-0.03%	4.78%	3.41%			3.41%
1971	5.46%	3.10%	102.09	5.57	3.16		1.15%	-0.74%	4.39%	5.89%	1.50%	4.57%	3.09%			3.09%
1972	5.23%	2.70%	118.05	6.17	3.19		10.76%	0.71%	3.84%	6.41%	2.57%	5.21%	2.72%			2.72%
1973	8.16%	3.70%	97.55	7.96	3.61		28.93%	13.24%	6.93%	6.90%	-0.03%	8.30%	4.30%			4.30%
1974	13.64%	5.43%	68.56	9.35	3.72		17.48%	3.14%	8.00%	7.40%	-0.60%	6.42%	5.59%			5.59%
1975	8.55%	4.14%	90.19	7.71	3.73		-17.54%	0.30%	5.80%	7.76%	1.96%	5.99%	4.13%			4.13%
1976	9.07%	3.93%	107.46	9.75	4.22		26.39%	13.10%	5.08%	6.81%	1.73%	8.19%	4.55%			4.55%
1977	11.43%	5.11%	95.1	10.87	4.86		11.53%	15.07%	5.12%	7.78%	2.66%	9.52%	5.92%			5.92%
1978	12.11%	5.39%	96.11	11.64	5.18		7.07%	6.60%	7.18%	9.15%	1.97%	8.48%	5.72%			5.72%
1979	13.48%	5.53%	107.94	14.55	5.97		25.01%	15.23%	10.38%	10.33%	-0.05%	11.70%	6.45%			6.45%
1980	11.04%	4.74%	135.76	14.99	6.44		3.01%	7.81%	11.24%	12.43%	1.19%	11.01%	5.03%			5.03%
1981	12.39%	5.57%	122.55	15.18	6.83		1.31%	6.08%	14.71%	13.98%	-0.73%	11.42%	5.73%			5.73%
1982	9.83%	4.93%	140.64	13.82	6.93		-8.95%	1.58%	10.54%	10.47%	-0.07%	7.96%	4.90%			4.90%
1983	8.06%	4.32%	164.93	13.29	7.12		-3.84%	2.76%	8.80%	11.80%	3.00%	9.09%	4.31%			4.31%
1984	10.07%	4.68%	167.24	16.84	7.83		26.69%	9.85%	9.85%	11.51%	1.66%	11.02%	5.11%			5.11%
1985	7.42%	3.88%	211.28	15.68	8.20		-6.91%	4.74%	7.72%	8.99%	1.27%	7.89%	4.03%	6.75%		3.84%
1986	5.96%	3.38%	242.17	14.43	8.19		-7.93%	-0.15%	6.16%	7.22%	1.06%	5.54%	3.36%	6.96%		3.58%
1987	6.49%	3.71%	247.08	16.04	9.17		11.10%	11.99%	5.47%	8.86%	3.39%	9.66%	4.18%	8.58%		3.99%
1988	8.20%	3.68%	277.72	24.12	10.22		50.42%	11.49%	6.35%	9.14%	2.79%	9.76%	4.12%	7.67%		3.77%
1989	6.80%	3.32%	353.4	24.32	11.73		0.83%	14.80%	8.37%	7.93%	-0.44%	9.58%	3.85%	7.46%		3.51%
1990	6.58%	3.74%	330.22	22.65	12.35		-6.87%	5.26%	7.81%	8.07%	0.26%	7.39%	3.92%	7.19%		3.89%
1991	4.58%	3.11%	417.09	19.30	12.97		-14.79%	5.03%	7.00%	6.70%	-0.30%	6.34%	3.27%	7.81%		3.48%
1992	4.16%	2.90%	435.71	20.87	12.64		8.13%	-2.59%	5.30%	6.68%	1.38%	4.67%	2.83%	9.83%		3.55%
1993	4.25%	2.72%	466.45	26.90	12.69		28.89%	0.41%	3.50%	5.79%	2.29%	4.73%	2.74%	8.00%		3.17%
1994	5.89%	2.91%	459.27	31.75	13.36		18.03%	5.34%	5.00%	7.82%	2.82%	7.23%	3.06%	7.17%		3.55%
1995	5.74%	2.30%	615.93	37.70	14.17		18.74%	6.00%	3.50%	5.57%	2.07%	5.65%	2.44%	6.50%		3.29%
1996	4.83%	2.01%	740.74	40.63	14.89		7.77%	5.10%	5.00%	6.41%	1.41%	6.13%	2.11%	7.92%		3.20%
1997	4.08%	1.60%	970.43	44.09	15.52		8.52%	4.25%	5.35%	5.74%	0.39%	5.45%	1.67%	8.00%		2.73%
1998	3.11%	1.32%	1229.23	44.27	16.20		0.41%	4.37%	4.33%	4.65%	0.32%	4.60%	1.38%	7.20%		2.26%
1999	3.07%	1.14%	1469.25	51.68	16.71		16.74%	3.16%	5.37%	6.44%	1.07%	5.75%	1.20%	12.50%		2.05%
2000	3.94%	1.23%	1320.28	56.13	16.27		8.61%	-2.65%	5.73%	5.11%	-0.62%	3.71%	1.65%	12.00%		2.87%
2001	3.85%	1.37%	1148.09	38.85	15.74	30.08	-30.79%	-3.24%	1.80%	5.05%	3.25%	3.56%	1.73%	10.30%	3.62%	2.91%
2002	5.23%	1.83%	879.82	46.04	16.08	29.83	18.51%	2.15%	1.20%	3.81%	2.61%	3.57%	2.29%	8.00%	4.10%	4.73%
2003	4.87%	1.61%	1111.91	54.69	17.88	31.58	18.79%	11.19%	1.00%	4.25%	3.25%	5.35%	2.12%	11.00%	3.69%	4.74%
2004	5.58%	1.60%	1211.92	67.68	19.407	40.60	23.75%	8.54%	2.18%	4.22%	2.04%	4.90%	2.02%	8.50%	3.65%	4.86%
2005	5.47%	1.79%	1248.29	76.45	22.38	61.17	12.96%	15.32%	4.31%	4.39%	0.08%	6.16%	2.20%	8.00%	4.08%	5.22%
2006	6.18%	1.77%	1418.3	87.72	25.05	73.16	14.74%	11.93%	4.88%	4.70%	-0.18%	5.93%	1.97%	12.50%	4.16%	6.12%
2007	5.62%	1.89%	1468.36	82.54	27.73	95.36	-5.91%	10.70%	3.31%	4.02%	0.71%	5.03%	2.06%	5.00%	4.37%	4.59%
2008	7.24%	3.11%	903.25	65.39	28.05	67.52	-20.78%	1.15%	1.59%	2.21%	0.62%	2.11%	4.05%	4.00%	6.43%	6.92%
2009	5.35%	2.00%	1115.10	59.65	22.31	37.43	-8.78%	-20.46%	0.14%	3.84%	3.70%	0.28%	2.60%	7.20%	4.36%	4.64%
2010	6.65%	1.84%	1257.64	83.66	23.12	55.53	40.25%	3.63%	0.13%	3.29%	3.16%	3.33%	2.24%	6.95%	5.20%	6.09%
2011	7.72%	2.07%	1257.60	97.05	26.02	71.28	16.01%	12.54%	0.03%	1.88%	1.85%	2.75%	2.71%	7.18%	6.01%	8.34%
2012	7.18%	2.13%	1426.19	102.47	30.44	75.90	5.58%	16.99%	0.05%	1.76%	1.71%	2.93%	2.47%	5.27%	5.78%	7.30%
2013	5.81%	1.96%	1848.36	107.45	36.28	88.13	4.86%	19.19%	0.07%	3.04%	2.97%	5.01%	2.03%	4.28%	4.96%	4.99%
2014	5.49%	1.92%	2058.90	113.01	39.44	101.98	5.17%	8.71%	0.05%	2.17%	2.12%	2.77%	2.24%	5.58%	5.78%	5.48%
2015	5.20%	2.11%	2043.94	106.32	43.16	106.10	-5.92%	9.43%	0.21%	2.27%	2.06%	2.96%	2.46%	5.51%	6.12%	5.16%
2016	4.86%	2.01%	2238.83	108.86	45.03	108.67	2.39%	4.33%	0.51%	2.45%	1.94%	2.64%	2.41%	5.54%	5.69%	4.50%
2017	4.67%	1.86%	2673.61	124.94	49.73	108.28	14.77%	10.44%	1.39%	2.41%	1.02%	3.22%	2.36%	7.05%	5.08%	4.75%
2018	5.92%	2.14%	2506.85	148.34	53.61	136.65	18.73%	7.80%	2.37%	2.68%	0.31%	3.24%	2.50%	4.12%	5.96%	5.55%
2019	5.03%	1.82%	3230.78	162.35	58.80	150.50	9.44%	9.68%	1.55%	1.92%	0.37%	2.57%		3.96%	5.20%	5.06%
2020	3.68%	1.51%	3756.07	138.12	56.70	127.78	-14.92%	-3.57%	0.09%	0.93%	0.84%	0.74%	1.65%	5.42%	4.72%	4.94%
2021	4.33%	1.24%	4766.18	206.38	59.20	147.24	47.67%	4.41%	0.06%	1.51%	1.45%	1.71%	1.72%	6.47%	4.24%	4.90%

* Earnings and dividends numbers each year reflect the estimated numbers as of the end of the year. These numbers get updated later in the year but I do not update the numbers in this spreadsheet

**2022 Multistage Earnings Growth Model
Railroad Industry**

Company Ticker 4.14% GDP
21.5 Industry P/E
33.0% Target Dividend Payout Ratio (All dividends to net profit)
31.5% Target ROE

Union Pacific Corp. UNP

Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
0		52.64%	47.36%	9.95		stock price =	(251.93)
1	16.58%	36.83%	63.17%	11.60	7.33		7.33
2	11.60%	33.00%	67.00%	12.95	8.67		8.67
3	10.40%	29.90%	70.10%	14.29	10.02		10.02
4	9.42%	27.32%	72.68%	15.64	11.37		11.37
5	8.61%	24.49%	75.51%	16.98	12.82		12.82
6	7.71%	21.65%	78.35%	18.29	14.33		14.33
7	6.82%	18.81%	81.19%	19.54	15.86		15.86
8	5.93%	15.98%	84.02%	20.70	17.39		17.39
9	5.03%	13.14%	86.86%	21.74	18.88		18.88
10	4.14%	13.14%	86.86%	22.64	19.67	506.83	526.50
11+	4.14%	13.14%	86.86%	23.58	20.48		

Value Line Dividends Growth Rate

IRR = **10.99%**

Norfolk Southern Corp. NSC

Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
0		45.91%	54.09%	12.10		stock price =	(297.71)
1	14.46%	38.96%	61.04%	13.85	8.45		8.45
2	12.27%	34.70%	65.30%	15.55	10.15		10.15
3	10.93%	31.28%	68.72%	17.25	11.85		11.85
4	9.85%	28.48%	71.52%	18.95	13.55		13.55
5	8.97%	25.41%	74.59%	20.65	15.40		15.40
6	8.00%	22.34%	77.66%	22.30	17.32		17.32
7	7.04%	19.28%	80.72%	23.87	19.27		19.27
8	6.07%	16.21%	83.79%	25.32	21.22		21.22
9	5.11%	13.14%	86.86%	26.61	23.12		23.12
10	4.14%	13.14%	86.86%	27.72	24.07	620.42	644.49
11+	4.14%	13.14%	86.86%	28.86	25.07		

Value Line Dividends Growth Rate

IRR = **11.36%**

CSX Corp. CSX

Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow
0		40.96%	59.04%	\$ 1.55		stock price =	(37.49)
1	12.90%	43.30%	56.70%	1.75	0.99		0.99
2	13.64%	38.10%	61.90%	1.99	1.23		1.23
3	12.00%	34.02%	65.98%	2.23	1.47		1.47
4	10.72%	30.73%	69.27%	2.47	1.71		1.71
5	9.68%	27.21%	72.79%	2.70	1.97		1.97
6	8.57%	23.69%	76.31%	2.94	2.24		2.24
7	7.46%	20.18%	79.82%	3.16	2.52		2.52
8	6.36%	16.66%	83.34%	3.36	2.80		2.80
9	5.25%	13.14%	86.86%	3.53	3.07		3.07
10	4.14%	13.14%	86.86%	3.68	3.20	82.35	85.55
11+	4.14%	13.14%	86.86%	3.83	3.33		

Value Line Dividends Growth Rate

IRR = **11.89%**

Canadian National		CNI						
Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow	
0		64.17%	35.83%	4.70			stock price =	(122.86)
1	20.21%	30.62%	69.38%	5.65	3.92			3.92
2	9.65%	27.93%	72.07%	6.20	4.46			4.46
3	8.80%	25.67%	74.33%	6.74	5.01			5.01
4	8.09%	23.75%	76.25%	7.29	5.55			5.55
5	7.48%	21.63%	78.37%	7.83	6.14			6.14
6	6.81%	19.51%	80.49%	8.36	6.73			6.73
7	6.14%	17.39%	82.61%	8.88	7.33			7.33
8	5.48%	15.26%	84.74%	9.36	7.93			7.93
9	4.81%	13.14%	86.86%	9.81	8.52			8.52
10	4.14%	13.14%	86.86%	10.22	8.88	228.78		237.66
11+	4.14%	13.14%	86.86%	10.64	9.24			9.24
<i>Value Line Dividends Growth Rate</i>							IRR =	10.23%

Canadian Pacific		CP						
Year	Growth Rate	Reinvestment Rate	Payout Ratio	Earnings	FCFE	Terminal Value	Cash Flow	
0		45.35%	54.65%	3.15			stock price =	(71.94)
1	14.29%	34.73%	65.27%	3.60	2.35			2.35
2	10.94%	31.31%	68.69%	3.99	2.74			2.74
3	9.86%	28.50%	71.50%	4.39	3.14			3.14
4	8.98%	26.15%	73.85%	4.78	3.53			3.53
5	8.24%	23.55%	76.45%	5.18	3.96			3.96
6	7.42%	20.95%	79.05%	5.56	4.39			4.39
7	6.60%	18.35%	81.65%	5.93	4.84			4.84
8	5.78%	15.74%	84.26%	6.27	5.28			5.28
9	4.96%	13.14%	86.86%	6.58	5.71			5.71
10	4.14%	13.14%	86.86%	6.85	5.95	153.39		159.34
11+	4.14%	13.14%	86.86%	7.14	6.20			
<i>Value Line Dividends Growth Rate</i>							IRR =	11.81%

Union Pacific Corp
Implied Constant Growth - Union Pacific Corp
2022

Share Price		\$	251.93
Dividend Per Share		\$	4.20
Share Repurchase		\$	11.34
Expected Long-Term Growth Rate:			4.14%
Indexed Equity Value at Year 0:	[1] = P0		100
Equity Payout Yield at Year 1:	[2] = D1/P0		6.17%
Internal Rate of Return (IRR) at Assumed Growth Rates:	[3]		11.06%
Implied Constant Long-Term Growth:	[4] = [3] - [2]		4.89%

Data for Calculation of IRR

Check of Implied Constant Growth Rate

Year	Cash Flow Expected Growth Rate	Indexed Equity Payout at Assumed Growth Rates	Period	Indexed Equity Payout at Implied Constant Growth Rate	Net Present Value @ 11.06%
		-100			
2021	20.10%	6.2	1	6.2	5.6
2022	10.87%	6.8	2	6.5	5.2
2023	5.35%	7.2	3	6.8	5.0
2024	5.35%	7.6	4	7.1	4.7
2025	5.35%	8.0	5	7.5	4.4
2026	5.35%	8.4	6	7.8	4.2
2027	5.15%	8.9	7	8.2	3.9
2028	4.95%	9.3	8	8.6	3.7
2029	4.75%	9.7	9	9.0	3.5
2030	4.54%	10.2	10	9.5	3.3
2031	4.34%	10.6	11	9.9	3.1
2520	4.14%	4,378,659,911.3	500	137,006,612,338.1	0.0
				Total NPV	100.0

Norfolk Southern Corp.
Implied Constant Growth - Norfolk SouthernCorp
2022

Share Price		\$	297.71
Dividend Per Share		\$	4.16
Share Repurchase		\$	13.97
Expected Long-Term Growth Rate:			4.14%
Indexed Equity Value at Year 0:	[1] = P0		100
Equity Payout Yield at Year 1:	[2] = D1/P0		6.09%
Internal Rate of Return (IRR) at Assumed Growth Rates:	[3]		10.90%
Implied Constant Long-Term Growth:	[4] = [3] - [2]		4.81%

Data for Calculation of IRR

Check of Implied Constant Growth Rate

Year	Cash Flow Expected Growth Rate	Indexed Equity Payout at Assumed Growth Rates	Period	Indexed Equity Payout at Implied Constant Growth Rate	Net Present Value @ 10.90%
		-100			
2021	23.30%	6.1	1	6.1	5.5
2022	9.57%	6.7	2	6.4	5.2
2023	5.37%	7.0	3	6.7	4.9
2024	5.37%	7.4	4	7.0	4.6
2025	5.37%	7.8	5	7.4	4.4
2026	5.37%	8.2	6	7.7	4.1
2027	5.17%	8.7	7	8.1	3.9
2028	4.96%	9.1	8	8.5	3.7
2029	4.76%	9.5	9	8.9	3.5
2030	4.55%	9.9	10	9.3	3.3
2031	4.35%	10.4	11	9.7	3.1
2520	4.14%	4,276,556,134.1	500	93,604,183,152.1	0.0
				Total NPV	100.0

CSX Corp.
Implied Constant Growth - CSX
2022

Share Price		\$37.49
Dividend Per Share		\$ 0.37
Share Repurchase		\$ 1.28
Expected Long-Term Growth Rate:		4.14%
Indexed Equity Value at Year 0:	[1] = P0	100
Equity Payout Yield at Year 1:	[2] = D1/P0	4.41%
Internal Rate of Return (IRR) at Assumed Growth Rates:	[3]	10.02%
Implied Constant Long-Term Growth:	[4] = [3] - [2]	5.61%

Data for Calculation of IRR

Check of Implied Constant Growth Rate

Year	Cash Flow Expected Growth Rate	Indexed Equity Payout at Assumed Growth Rates	Period	Indexed Equity Payout at Implied Constant Growth Rate	Net Present Value @ 10.02%
		-100			
2021	21.55%	4.4	1	4.4	4.0
2022	13.64%	5.0	2	4.7	3.8
2023	8.39%	5.4	3	4.9	3.7
2024	8.39%	5.9	4	5.2	3.5
2025	8.39%	6.4	5	5.5	3.4
2026	8.39%	6.9	6	5.8	3.3
2027	7.68%	7.4	7	6.1	3.1
2028	6.97%	8.0	8	6.5	3.0
2029	6.26%	8.5	9	6.8	2.9
2030	5.56%	8.9	10	7.2	2.8
2031	4.85%	9.4	11	7.6	2.7
2520	4.14%	3,858,912,934.7	500	2,938,121,033,119.9	0.0
				Total NPV	100.0

Canadian National
Implied Constant Growth - Canadian National
2022

Share Price	\$ 122.86
Dividend Per Share	\$ 1.87
Share Repurchase	\$ 1.78

Expected Long-Term Growth Rate: 4.14%

Indexed Equity Value at Year 0:	[1] = P0	100
Equity Payout Yield at Year 1:	[2] = D1/P0	2.97%
Internal Rate of Return (IRR) at Assumed Growth Rates:	[3]	7.61%
Implied Constant Long-Term Growth:	[4] = [3] - [2]	4.64%

Data for Calculation of IRR

Check of Implied Constant Growth Rate

Year	Cash Flow Expected Growth Rate	Indexed Equity Payout at Assumed Growth Rates	Period	Indexed Equity Payout at Implied Constant Growth Rate	Net Present Value @ 7.61%
		-100			
2021	11.11%	3.0	1	3.0	2.8
2022	14.39%	3.4	2	3.1	2.7
2023	5.35%	3.6	3	3.3	2.6
2024	5.35%	3.8	4	3.4	2.5
2025	5.35%	4.0	5	3.6	2.5
2026	5.35%	4.2	6	3.7	2.4
2027	5.15%	4.4	7	3.9	2.3
2028	4.94%	4.6	8	4.1	2.3
2029	4.74%	4.8	9	4.3	2.2
2030	4.54%	5.1	10	4.5	2.1
2031	4.34%	5.3	11	4.7	2.1
2520	4.14%	2,175,710,919.0	500	20,009,960,444.2	0.0
				Total NPV	100.0

Canadian Pacific
Implied Constant Growth - Canadian Pacific
2022

Share Price		\$	71.94
Dividend Per Share		\$	0.60
Share Repurchase		\$	-
Expected Long-Term Growth Rate:			4.14%
Indexed Equity Value at Year 0:	[1] = P0		100
Equity Payout Yield at Year 1:	[2] = D1/P0		4.36%
Internal Rate of Return (IRR) at Assumed Growth Rates:	[3]		8.96%
Implied Constant Long-Term Growth:	[4] = [3] - [2]		4.60%

Data for Calculation of IRR

Check of Implied Constant Growth Rate

Year	Cash Flow Expected Growth Rate	Indexed Equity Payout at Assumed Growth Rates	Period	Indexed Equity Payout at Implied Constant Growth Rate	Net Present Value @ 8.96%
		-100			
2021	9.33%	4.4	1	4.4	4.0
2022	13.41%	4.9	2	4.6	3.8
2023	4.52%	5.2	3	4.8	3.7
2024	4.52%	5.4	4	5.0	3.5
2025	4.52%	5.6	5	5.2	3.4
2026	4.52%	5.9	6	5.5	3.3
2027	4.46%	6.2	7	5.7	3.1
2028	4.40%	6.4	8	6.0	3.0
2029	4.33%	6.7	9	6.2	2.9
2030	4.27%	7.0	10	6.5	2.8
2031	4.07%	7.3	11	6.8	2.7
2520	4.14%	3,002,494,186.2	500.0	24,179,771,167.4	0.0
				Total NPV	100.0